WHAT IS CLAIMED IS:

1. A burner for non-symmetrical combustion, comprising:

a burner housing enclosing a burner plenum;

a fuel conduit extending longitudinally within the housing and positioned coaxial with a line spaced from a central axis of the burner, with the fuel conduit defining a fuel exit opening;

a baffle defining an air conduit extending longitudinally within the housing, with the air conduit terminating in an air opening on an opposite side of the burner central axis from the fuel exit opening;

at least one oxygen injection lance extending longitudinally within the housing and partially through the air conduit; and

a burner port block adjacent to the baffle and downstream of the air opening and in fluid communication with the fuel conduit and the air conduit.

2. The burner of claim 1, wherein the burner port block has a sidewall diverging downstream of the air opening.

3. The burner of claim 2, wherein the sidewall of the burner port block diverges at a flare angle of between approximately 2° and 30°.

4. The burner of claim 2, wherein the sidewall of the burner port block diverges from the burner central axis at the flare angle of between approximately 2° and 30°.

5. The burner of claim 1, wherein the air conduit has a cross-sectional shape in the form of a segment of a circle defined by a chord.

6. The burner of claim 5, wherein the burner includes a plurality of oxygen injection lances symmetrically positioned within the chord-shaped air conduit.

7. The burner of claim 1, wherein the baffle further defines a primary stabilization cavity immediately adjacent the fuel exit opening, with the cavity in fluid communication with the fuel conduit via the fuel exit opening.

8. The burner of claim 7, wherein the cavity is cylindrical-shaped and coaxial with the fuel conduit.

9. The burner of claim 7, further comprising a combustion gas conduit extending through the burner plenum and connected to the cavity, and wherein the burner plenum is connected to a diverter valve configured to selectively admit combustion gas from the burner plenum into the combustion gas conduit.

10. The burner of claim 7, further comprising a combustion gas conduit extending through the burner plenum and connected to the cavity, wherein the baffle separates the burner port block from the burner plenum, and wherein the fuel conduit is positioned coaxially within the combustion gas conduit.

11. The burner of claim 10, wherein the burner plenum is connected to a diverter valve configured to selectively admit combustion gas into the combustion gas conduit.

12. The burner of claim 10, further comprising swirl vanes positioned within the combustion gas conduit and peripherally spaced around the fuel conduit.

13. The burner of claim 1, further comprising an auxiliary fuel conduit extending longitudinally through the burner plenum and connected to the burner port block, with the auxiliary fuel conduit defining an auxiliary fuel exit opening radially spaced from the fuel exit opening and coterminous with the burner port block.

14. The burner of claim 13, wherein the auxiliary fuel exit opening is positioned on the opposite side of the burner central axis from the air opening.

15. A burner for non-symmetrical combustion, comprising:

a burner housing enclosing a burner plenum;

a fuel conduit extending longitudinally within the housing and positioned coaxial with a line spaced from a central axis of the burner, with the fuel conduit defining a fuel exit opening;

a baffle defining an air conduit extending longitudinally within the housing, with the air conduit having an air opening on an opposite side of the burner central axis from the fuel exit opening, with the air opening positioned a greater distance away from the burner central axis than the fuel exit opening;

at least one oxygen injection lance extending longitudinally within the housing and partially through the air conduit; and

a burner port block adjacent to the baffle and downstream of the air opening and in fluid communication with the fuel conduit and the air conduit, with the burner port block having a sidewall diverging downstream of the air opening.

16. The burner of claim 15, wherein the sidewall of the burner port block diverges from the burner central axis at a flare angle of between approximately 2° and 30°.

17. The burner of claim 15, wherein the air conduit has a cross-sectional shape in the form of a segment of a circle defined by a chord.

18. The burner of claim 17, wherein the burner includes a plurality of oxygen injection lances symmetrically positioned within the chord-shaped air conduit.

19. The burner of claim 15, wherein the baffle further defines a primary stabilization cavity immediately adjacent the fuel exit opening, with the cavity in fluid communication with the fuel conduit via the fuel exit opening.

20. The burner of claim 19, wherein the cavity is cylindrical-shaped and coaxial with the fuel conduit.

21. The burner of claim 19, further comprising a combustion gas conduit extending through the burner plenum and connected to the cavity, and wherein the burner plenum is connected to a diverter valve configured to selectively admit combustion gas from the burner plenum into the combustion gas conduit.

22. The burner of claim 19, further comprising a combustion gas conduit extending through the burner plenum and connected to the cavity, wherein the baffle separates the burner port block from the burner plenum, and wherein the fuel conduit is positioned coaxially within the combustion gas conduit.

23. The burner of claim 22, wherein the burner plenum is connected to a diverter valve configured to selectively admit combustion gas into the combustion gas conduit.

24. The burner of claim 22, further comprising swirl vanes positioned within the combustion gas conduit and peripherally spaced around the fuel conduit.

25. The burner of claim 15, further comprising an auxiliary fuel conduit extending longitudinally through the burner plenum and connected to the burner port block, with the auxiliary fuel conduit defining an auxiliary fuel exit opening radially spaced from the fuel exit opening and coterminous with the burner port block, wherein the auxiliary fuel exit opening is positioned on the opposite side of the burner central axis from the air opening.

26. A method of non-symmetric combustion in a burner, comprising the steps of:

injecting fuel along a first axis and out through a fuel exit opening, with the first axis spaced from a central axis of the burner;

dispersing oxygen into combustion gas;

discharging the combustion gas containing dispersed oxygen through an air conduit having an air opening along a second axis, with the second axis positioned on an opposite side of the burner central axis from the first axis;

inducing the combustion gas containing dispersed oxygen to flow toward a sidewall of a burner port block;

mixing the combustion gas containing dispersed oxygen with the injected fuel;

igniting the mixed combustion gas containing dispersed oxygen and injected fuel; and

recirculating products of combustion into the discharging combustion gas containing dispersed oxygen.

27. The method of claim 26, wherein the sidewall diverges from the burner central axis, and the method further comprises the step of inducing the combustion gas containing dispersed oxygen to flow in a diverging manner along the sidewall of the burner port block.

28. The method of claim 26, wherein the burner further comprises an auxiliary fuel conduit coaxial with a third axis and defining an auxiliary fuel exit opening, with the third axis radially spaced from the first axis, and the method further comprising the step of injecting auxiliary fuel along the third axis and out through the auxiliary fuel exit opening in place of the step of injecting the fuel along the first axis.

29. The method of claim 26, further comprising the step of dispersing the oxygen into the combustion gas through at least one oxygen injection lance extending at least partially into the air conduit.

30. The method of claim 29, wherein the air conduit has a cross-sectional shape in the form of a segment of a circle defined by a chord and the at least one oxygen injection lance includes a plurality of oxygen injection lances symmetrically positioned within the air conduit such that the step of dispersing the oxygen into the combustion gas through the plurality of oxygen injection lances results in a uniform dispersal of the oxygen into the combustion gas.